

AN ECONOMIC ANALYSIS OF FACTORS AFFECTING SUCCESS
OF KANSAS GRAIN COOPERATIVES, 1963-64

by

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INTRODUCTION

A business exists because it fulfills a necessary or desired need. Marketing and farm supply farmer cooperatives, as a response to a need, were created and have expanded over the years until they now play an important role in the agriculture sector of the economy. Cooperatives are a direct result of the efforts of the American farmers who have joined together to obtain better bargaining positions than would be possible as individuals.

Kansas farmer cooperatives, like other businesses, must change with changing times if they are to accomplish their intended goals. Since their inception and especially during the last two decades, farmer cooperatives have faced ever changing conditions, and the demands placed on them have also changed. During this period increased emphasis has been placed on services and products offered patrons and, furthermore, changes have occurred in the institutional framework within which cooperatives operate. Cooperatives have found that in order to survive they must adjust to these changing times.

In the years following World War II, improved technology and changed farming methods enabled the American farmer to greatly expand production. Farmers increased purchases of inputs such as feeds, fertilizers, or gas and oil for farm equipment. Farmer cooperatives, in addition to marketing farm products, became major suppliers of farm supplies.

As a result of increased production, in the short span of years from 1952 to 1955, the July 1 wheat carryover increased from 255 million bushels to over 1,000 million bushels.¹ Carryover is defined as the difference between total supply and total disappearance. The United States government, acting through the Commodity Credit Corporation, became a major owner of wheat and paid storage to elevators and farmers who would store the carryover.

Facilities of country elevators, often old and inadequate, were unable to receive and handle grain adequately during the peak of the harvesting season and lacked the storage space to hold the large stocks. These situations created the demand for the building of modern and expanded facilities.

As need for additional storage space became apparent, the government responded with various occupancy guarantees and income tax reliefs. These inducements played an important part in the increase of storage capacity in Kansas, which had increased over five times in the 20 years since 1945.² From the period 1945 to 1959, about 55 percent of the increase in commercial storage capacity was accounted for by country elevator construction, 41 percent was attributed to terminal elevator construction, and about 4 percent was attributed to flour mill construction.³

¹Wheat Situation Report, United States Department of Agriculture, Economic Research Service, June 1960, p. 6.

²Farm Facts, 1963-1964, Statistical Division, Kansas State Board of Agriculture, p. 38.

³Gary Francis Sullivan, "The Impact of Government Storage Policy on the Size and Location of Commercial Storage Facilities in Kansas" (unpublished Master's report, Department of Agricultural Economics, Kansas State University, 1961), p. 49.

Much of the impetus in local storage construction was probably due to the government's policy of storing grain close to the source of production. As a result storage of wheat became a very profitable source of income for grain cooperatives. Manuel¹ in a study of Kansas cooperatives found that storage and handling income had increased from 20.9 percent of gross operating income in 1950 to 62.4 percent of gross operating income in 1960.

During the 1960's production controls have been more effective. Imports have decreased, and exports have increased; hence, in 1964, the July 1 carryover dropped below 1,000 million bushels for the first time in six years.² C.C.C. grain stored in approved Kansas commercial storage facilities has decreased from 67 percent of capacity on March 31, 1962 to 36 percent of capacity on December 31, 1964.³

Government policy has changed and it would seem to indicate that commercial storage as a major source of income for Kansas grain associations is about to be eliminated or at least reduced in importance. It seems unlikely that the C.C.C. will again be such a large owner of wheat.

Farmer cooperatives operate in a somewhat different environment than do private retail firms. The cooperative is considered by the member patron as an extension of his farming enterprise. Thus the operations of the cooperative may be affected by member loyalty and

¹Milton L. Manuel, A Decade of Farmer Cooperatives in Kansas, Kansas State Agricultural Experiment Station, Bulletin 450, December 1962, p. 16.

²Wheat Situation Report, op. cit., February 1965, p. 2.

³Letter from Mr. Carl M. Heaton, Acting Director, Agricultural Stabilization and Conservation Service, United States Department of Agriculture, Kansas City, Missouri, April 14, 1965.

member ability.

The goal of a farmer cooperative is assumed to be to maximize the long-run returns to the member patrons. This study is not concerned with influences such as member loyalty, elements of nature, different degrees of managerial ability, and other influences which are difficult to measure. This study is concerned only with those items found within the financial statements of the cooperative and assumed that all managers are equal in managerial ability and desire for risk bearing.

THE PROBLEM

The immediate problem facing the cooperatives derives from changing government policies affecting the agricultural community in which the Kansas associations operate. The government, by decreasing C.C.C. grain stocks, is eliminating a large percent of an association's income. The associations,¹ with large amounts of fixed assets in storage facilities, are faced with a heavy fixed cost burden in the form of depreciation, taxes, insurance, and maintenance and repairs which must be covered. The problem then is how should these associations recombine their resources to maximize profits.

The basic and underlying problem, however, is how cooperatives make decisions pertaining to what combinations of products to offer, what combination of resources to use, and how much of the products to

¹The term associations, cooperatives, and firms are used synonymously throughout the study.

offer. When storage needs were of maximum concern, the government eliminated much risk entailed in building new facilities. Associations found that with large income from storage they could obtain a satisfactory profit and often seemed unconcerned in finding a more efficient combination of resources.

Associations now, more than ever, need to know how much a particular product contributes to the success of the total business operations.

OBJECTIVES OF STUDY

The general objective of the study is to determine the financial success of the Kansas grain cooperatives for 1963-64.

More specifically, the objectives are (1) to determine the success of associations in 1963-64, (2) to determine the adequacy of the accounting system as an aid to management decision making, (3) to determine certain selected efficiency and percentage ratios and to compare the ratios between associations of different sizes and different profit levels, and (4) to determine the extent departmentation is being used.

This study is confined to an analysis of 64 associations whose financial positions were considered to be representative of Kansas grain cooperatives.

REVIEW OF LITERATURE

One of the purposes of the study is to determine the adequacy of the accounting systems used.

Phillips¹ stated that an effective accounting system is an essential tool to management in country elevators and retail farm supply businesses. Proper accounting records provide management with a measure of the business efficiency for the different phases of the total operation as well as for the business as a whole. They make it possible to evaluate performance for each of these operations, and indicate areas in which changes are needed in order to improve performance. For maximum benefit of an accounting system, records should not be kept for the firm as a whole. Records need to be kept for each major product and function in the business. In this respect, Phillips states the accounting used in many country elevator and retail farm supply businesses is woefully lacking.

Baumel² in a study of management productivity states that managers use a variety of managerial methods and techniques to approximate economic efficiency. Some managers make random decisions in some areas of management. Inputs may be added with no consideration of other alternatives. Products and services may be added simply because a customer asks for them. Outputs may be retained because the business has always provided them. He states the complexity of modern management problems precludes the exclusive use of hunches and snap judgments for successful management.

¹Richard Phillips, Managing for Greater Returns in Country Elevator and Retail Farm Supply Businesses, (Des Moines, Iowa: Garner Publishing Company, 1957) p. 125.

²Clarence P. Baumel, "Productivity of Management in Local Cooperative Elevators" (unpublished Ph. D. dissertation, Iowa State University, 1961).

Streeter¹ found that constant or increasing returns to scale existed for Kansas elevators. He further stated that there were definite limitations as to the extent grain storage and grain merchandising could be expanded because the quantity of grain available depends on current surplus, production, and trade area.

In another study of Kansas elevators, Kelley, McCoy, Tucker, and Altau² found that the sidelines function indicated increasing returns to scale. Their conclusion was that an expansion in sidelines would be profitable, and should be recommended. An expansion in sidelines would enable the firms (1) to use their facilities and labor more efficiently throughout the year, (2) to increase their business volume, and (3) to diversify and stabilize the business.

Another problem is to determine appropriate and meaningful measures of success. Sharp and Baumel³ said there are several measures of profitability for a firm. Among these are (1) net profit per dollar sales, (2) rate of return on owner investment, (3) net income expressed in dollars. In their study they used net profit per dollar sales. They concluded that net profit per dollar sales as a goal of a firm tends to violate the principles of economics and made the following recommendations:

¹Charles Streeter, "Resource Productivity and Returns to Scale in Kansas Cooperative Elevators in 1955" (unpublished Master's thesis, Department of Agricultural Economics, Kansas State University, 1959).

²Paul L. Kelley, et al. Resource Returns and Productivity Coefficients in Central and Western Kansas Country Elevators of Modern Construction, Kansas Agricultural Experiment Station, Technical Bulletin 88, March 1957, p. 25.

³John W. Sharp and Philip C. Baumel, A Financial Analysis of Ohio Elevator Operations, Ohio Agricultural Experiment Station, Research Bulletin 813, June 1958, p. 23.

- 1) That country elevators should not use net profit per dollar sales as a measure of success.
- 2) That analysis be directed toward using other dependent variables, such as rate of return on owner's investment and net profit expressed in dollars as a measure of successful elevator operations.
- 3) That further study include measuring the interrelationships between factors included in this study.
- 4) That elevator operators adopt a standardized accounting procedure.

Taylor¹ used an effectiveness index made up of two ratios to measure profitability or success. These were (1) percent operating savings is of sales, and (2) percent operating savings is of member equity. He further stated that using either of these two ratios alone would not have altered the general conclusions of the study.

Whitehair² in a study of Indiana cooperatives used, as a measure of a firm's success, the percentage return on investment for the firm in "its own right." This ratio was calculated by using only income from local operations as a percent of the investment in the local (total assets minus investment in other cooperatives).

¹Byron Eugene Taylor, "Analysis of Economic Factors Affecting Success of Operations of Selected Midwestern Petroleum Cooperatives" (unpublished Master's thesis, Department of Agricultural Economics, Kansas State University, 1958).

²Norman V. Whitehair, "Measuring Financial Performance of Cooperative Grain and Supply Firms in Indiana" (unpublished Ph. D. dissertation, Purdue University, 1964).

MODEL

Efficiency is the relationship between an output and a related input. Maximum efficiency is denoted when minimum resources are used to obtain a given product, or a maximum product is obtained from a given quantity of resources. Economic efficiency is indicated when resources are used in a manner to maximize a particular objective or end quantity which is relevant to the economic unit being considered. The sufficient conditions for economic efficiency can be determined only when prices of inputs and outputs are known.

Firm inefficiency always results in additional costs. These added costs are reflected in the prices farmers have to pay for supplies and services and in the prices farmers receive for their products. Ultimately, society also feels some of the effects of this inefficiency, since it has to pay higher prices for the farm products purchased. Inefficiency places an additional burden on society in the form of slower economic growth since, under inefficient conditions, agricultural industries use extra inputs which could be used more productively in other industries.

The Economic Framework

Economic theory provides a framework for determining the most profitable combination of resources to handle and products and services to be provided by a grain association. Phillips¹ lists three decisions

¹Richard Phillips, op. cit., pp. 22-31.

every firm has to make in order to obtain maximum economic efficiency.

1) The firm must decide the best combination of goods and services to provide. The business will have the most profitable balance of all products and services when it has a volume of each one which makes this ratio of marginal return divided by the marginal cost of each product and service equal to the same ratio for all other products and services in the business.

2) The selection of the lowest possible cost combinations of inputs to produce these goods and services. The business will have the lowest cost balance of all inputs used when it uses the quantity of each one which makes the ratio of the marginal value productivity divided by the marginal expenditure for each input equal to their ratio for all other inputs used in the business.

3) The selection of the most profitable level of production and size of business. The most profitable volume of output will be provided when the ratio of the marginal return to the combined marginal expenditure is exactly equal to the marginal rate of transformation between inputs and the output.

The economic framework presented for determining the optimum organization of the business is designated as the theory of the firm. It has received much attention by economists and is a well-developed body of theory. However, it does have some shortcomings. For instance, it assumes perfect knowledge, does not consider time, and assumes profit maximization. These, however, are essentially simplifying assumptions made to aid in an analysis.

In the real world there is neither perfect knowledge nor instantaneous production; hence, the elements of risk and uncertainty appear. Heady¹ states that without the combination of time, change, and the inability of perfect prediction, there would be no need for management, or perhaps more accurately, the need for management would arise only as the firm was initially established.

Management includes decision making on information that is known with certainty as well as information which is based on uncertainty. The manager of a business enterprise is often considered as performing the functions of (1) planning, (2) organizing, (3) directing, (4) coordinating, and (5) controlling in such a way as to provide for effective results. Management needs to know and use proper tools and techniques for maintaining an efficient operation.

Accounting Data

Effective management of a cooperative requires information that can be provided only by an adequate accounting system. An accurate and well-kept accounting system will not guarantee good management, but without it management is more likely to be ineffective and inefficient. Cooperatives with only one bookkeeper will not be able to afford an elaborate accounting system, but it is possible to keep records which will supply very valuable information for the manager.

¹Earl O. Heady, Economics of Agricultural Production and Resource Use (New York: Prentice-Hall, Inc., 1952), p. 466.

It has been said that accounting data provides some, but never enough, information about the marginal costs which economists are seeking. Powelson¹ lists two reasons why this situation exists: 1) Marginal cost applies to an additional increment in production, whereas accounting records show only the cost of production that took place. 2) A businessman uses marginal costs to help him determine what his output will be in the future. Thus, he compares future marginal cost with future marginal revenue to the extent that he can estimate them. His accounting records show only costs that have existed in the past, and these will not necessarily continue unchanged in the future.

Finney and Miller² state that accounting records do not show the value of a product or an item in the balance sheet at their realizable market value. Only a few assets such as cash are stated at actual realizable value. Inventories are not valued at actual or even estimated realizable values, even when the lower of cost or market valuation rule is applied.

Fixed assets are usually carried on the books in accordance with generally accepted accounting principles or conventions which are not concerned with currently realizable values.

Even though an accounting system records events as they happened in the past, the past is never quite divorced from the future and many clues can be obtained as to marginal cost. If good accounting records

¹John P. Powelson, Economic Accounting--A Textbook in Accounting Principles for Students of Economics and the Liberal Arts (McGraw-Hill Book Company, Inc., 1955), p. 195.

²H. A. Finney and Herbert E. Miller, Principles of Accounting, Intermediate 5th ed.; (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1959), p. 47.

are maintained for different volumes of output that have been obtained in the past, a manager will be better able to predict future costs, volumes, prices, margins, and thus profitability.

An effective accounting system can provide information as to the profitability of various phases of the business operation. A good accounting system will tell which of the operations or departments is the most efficient, and can give an indication as to why some departments are less efficient. This information indicates to the manager what could be done to improve performance. Breaking down major activities of the business into departments or functions is essential to effective management. Without knowledge of the income and expenses of the various activities of a multi-product firm such as cooperatives, how can an intelligent decision be made concerning an activity?

Departmentation

Departmentation is the process of grouping various activities into separate units. Theo Haimann¹ states that a department is a distinct area of activities over which a manager has been given authority and for which he has accepted responsibility.

Various methods of departmentation are used. Three of the most common are the following:

1) Departmentation by functions—Basic functions of a business are (a) producing products or services, (b) selling products or services, and (c) financing the business. Thus, departmentation according to

¹Theo Haimann, Professional Management, St. Louis University, 1962, p. 156.

production, sales and finance is often found. The main disadvantage of this type of departmentation is that it makes effective control difficult, and it is next to impossible to determine the cost and profit of any one product or service.

2) Departmentation by product--Each product or group of closely related products is made a relatively separate unit within the overall framework of the business. This type of departmentation has the distinct advantage of making it possible to determine if a product is profitable, and is the type of departmentation which best provides the information desired by economists in their economic models for determining maximum profits of the firm.

3) Departmentation by location--Because of different locations of operations, a business may develop this type of departmentation. Many associations in the study have location accounting. This situation has developed primarily because of mergers with the branches continuing to keep records in much the same way as they did prior to merger. This method has the advantage of being the easiest one for record keeping, but has the disadvantage of not making it possible to determine profitability of an individual product or service.

Of the three types of departmentation presented, the one which can provide the manager with the most valuable information is departmentation by product. Accounting records should be kept showing revenue, physical volumes, and costs of each major product or service offered by the association.

Accounting information is of little benefit to managers if statements of departmental operations are prepared on only an annual basis. Statements should be made monthly if a manager is to derive maximum benefit from accounting records.

Use of Ratios

Ratio analysis is a technique which can be used by managers in planning the future operations and analyzing past performances. Such ratios can be easily obtained from the financial statements of the firm and compared with past operations, between departments, and with published standards.

The ratios which can be obtained from the financial statements are of two general types:

- 1) Efficiency ratios (input-output ratios). The greater the value of the ratio, the higher the efficiency. This ratio is computed or determined by dividing an output by a related input.

- 2) Percentage ratios show the percent one number is of another. Ratios may be computed from the income statement, the balance sheet, or by comparing a figure in the income statement with one in the balance sheet. Although ratios deal with averages and as such will not give the maximum profits, they still will provide management with a measure of the level of profits which have been achieved by the firm and give an indication of the weak points which need changing in the planning for the future.

The value of the business ratios lies in enabling management to see each item in relation to the whole. Ratios should be computed and their meaning interpreted in the light of other ratios. One ratio by itself has little meaning and should not be considered individually in an attempt to determine the condition of a business.

Ratios are no better than the information they are taken from, so if management is to make full use of and obtain the full benefit from ratio analysis, the firm must possess complete and accurate accounting records for all major departments. Then ratios for one department can be compared with those of other departments. Ratios for the same department can be compared from one month to the next. Also, ratios for the firm can be compared with published standards that might be available.

The preceding discussion indicates that complete and accurate accounting data and ratio analysis are valuable tools available to management in performing the functions of planning and controlling.

DATA

Firms used in this study are Kansas grain associations which carried on operations during 1963. All associations used in the study were audited by one of two auditing firms. Year-end audits were obtained for 64 associations, and information extracted from their financial statements was summarized. The approximate location of these associations is shown in Fig. 1.

Random sampling was used to select the associations from a total population of 232 associations. A 25 percent random sample was drawn using a table of random numbers. In addition, five of the largest grain

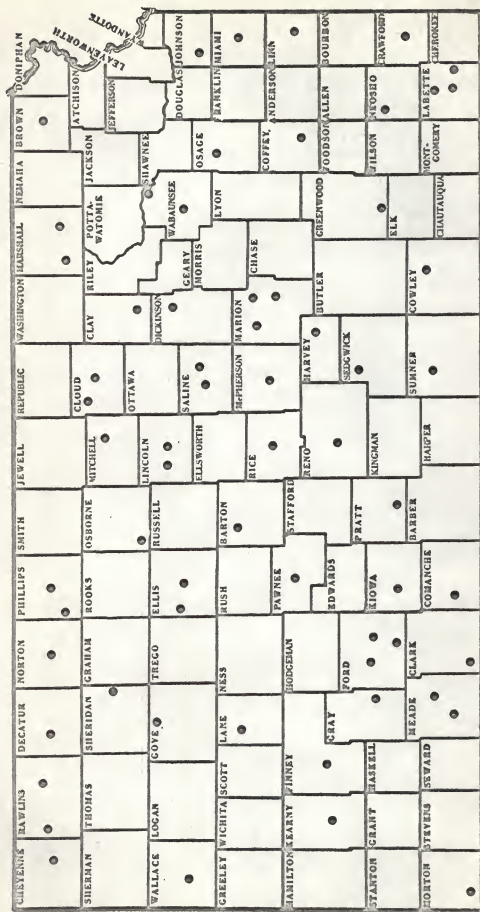


Fig. 1. Location of headquarters of 64 Kansas grain cooperatives

associations in the state were included. Including them was deemed desirable because they represent a large volume of sales in the state. Thus, although the general conditions found existing in the financial statements may be representative of Kansas grain cooperatives, this sample of 64 cannot be used in a predictive capacity for estimating total cooperative sales in the state.

The data do not refer to one 12-month period, but to a combination of 12-month periods ending any time from January 1, 1964 to November 30, 1964. (See Table 1.) However, this variation is not felt to detract seriously from the reliability of the data as used in this analysis.

TABLE 1--Distribution of accounting year ending dates

Ending date	Number of firms	:	Ending date	Number of firms
January 1	19	:	July 31	1
February 28	7	:	August 31	5
March 31	9	:	September 30	2
April 30	6	:	October 31	6
May 31	7	:	November 30	2

Grain associations, besides marketing grain, also sell a variety of farm supplies, such as petroleum products, feed, and fertilizer. A large percent of their income typically is derived from services such as storage, grinding, etc. Income from such services is not included in the sales figure. As a result, sales volume is a somewhat inadequate measure of the relative size of a grain association. The figure used for determining the relative size of operations was gross operating income. It was considered the best measure available because it includes

not only income from sales, but also income from storage, handling, and other services. No other indicator available would include these, and therefore, would not accurately reflect the total income earning capacity of the firm. Gross operating income is not an ideal measure, since some differences in margins on sales do exist, thus sales may vary and gross operating income will be the same.

For purposes of analysis, associations were divided into three groups based on gross operating income, as shown in Table 2.

TABLE 2.--Grouping of associations for analysis

	Number Associations	: Range in gross : operating income	: Range in storage : capacity (bushels)
Small	28	\$ 23,000--\$ 100,000	10,000-- 610,000
Medium	29	100,000-- 500,000	50,000--1,220,000
Large	7	500,000--1,230,000	196,000--5,200,000

Success is often defined as a favorable termination of a venture. In this study this is profit as a result of an economic venture.¹ The indicator chosen to determine degree of success is percent return on investment in local association. The method of computing return on investment can be described by the following ratio:

$$\text{Return on investment} = \frac{\text{Net Operating Savings}^1}{\text{Investment in local association}}$$

¹ Net operating savings for a cooperative are equivalent to net operating income for a private firm. These two terms are used interchangeably throughout the study.

The numerator is gross operating income minus total operating expenses, and the denominator is total assets minus investment in other cooperatives. Return on investment was used because it permits meaningful comparisons between businesses with different capital structures. This ratio gives an indication of economic productivity of capital and thus measures earning power of a cooperative in "its own right."

This indicator was computed for each association in the study and then used to further separate the three size groups into low and high profit categories. The three size groups were divided as follows: Small-14 low profit and 14 high profit, medium-15 low profit and 14 high profit, and large-4 low profit and 3 high profit.

FINANCIAL STATEMENT ANALYSIS

The term "financial statements" generally refers to two basic statements which are prepared for a business at the end of a specified period of time. These are the balance sheet and the statement of operations.

Balance Sheet

The balance sheet is a systematic exhibit of the kind and stated value of an association's assets at the end of an accounting period. It consists of assets, liabilities, and the member equity of an association. A balance sheet is a statement of the financial position at a given point in time and gives an idea of how the firm has financed its assets.

Only balance sheet items considered most important were tabulated in an effort to keep the material in a manageable form in this study, and to obtain consistency of accounts between associations.

Total Assets

Assets include the value of items either owned by or owed to the firm. Assets are commonly divided into current assets, fixed assets, and other assets.

Current assets include cash, accounts and notes receivable, inventories, and marketable securities. These are items which in the normal business operations can reasonably be expected to be sold or consumed during a given year.

Fixed assets are items owned by the association (land, buildings, and equipment) which are not readily convertible into cash during normal business operations. They are considered fairly permanent items, useable for several years, with a yearly depreciation charge being deducted from their value (except for land, which is not subject to depreciation).

Other assets include investments in securities of another company. In the case of cooperatives, other assets are composed essentially of investments in regional cooperatives.

The average grain association had total assets valued at \$886,279 (Table 3). Slightly more than one-half (52.1 percent) of the total assets were fixed assets, less than one-third (30.9 percent) were current assets, and 16.8 percent were invested in other cooperatives.

Associations included represented a broad spectrum of the grain cooperative industry in Kansas. The large group had assets averaging

TABLE 3.—Average assets and percent each is of total assets by size groups

	All associations :			Medium :			Large :		
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars
Cash	40,077	4.5	15,126	5.0	40,168	4.6	138,264	4.2	
Accounts receivable	49,396	5.6	17,911	6.0	57,160	6.5	143,170	4.4	
Grain inventories	62,335	7.0	17,187	5.7	58,915	6.7	257,094	7.8	
Other inventories	83,053	9.4	27,473	9.2	86,761	9.9	290,014	8.8	
Other current assets	39,242	4.4	9,311	3.1	33,704	3.9	181,901	5.7	
TOTAL CURRENT ASSETS	274,013	30.9	87,008	29.0	277,008	31.6	1,010,443	30.9	
Investment in other co-ops	149,117	16.8	62,065	20.7	137,630	15.7	544,914	16.6	
Other investments	1,599	0.2	14	0.0	1,351	0.2	9,881	0.3	
TOTAL OTHER ASSETS	150,816	17.0	62,079	20.7	138,981	15.9	554,795	16.9	
Building and equipment (gross)	668,718	75.5	217,104	72.4	669,154	76.4	2,473,374	75.6	
Less depreciation	215,891	24.4	67,695	22.6	215,000	24.6	812,370	24.8	
Building and equipment (net)	452,827	51.1	149,409	49.8	454,154	51.8	1,661,004	50.8	
Land	8,533	1.0	1,528	0.5	5,929	0.7	47,341	1.4	
TOTAL FIXED ASSETS	461,360	52.1	150,937	50.3	460,083	52.5	1,708,345	52.2	
TOTAL ASSETS	886,279	100.0	300,024	100.0	876,072	100.0	3,273,583	100.0	

over \$3.27 million, roughly 4 times as large as the medium group and 11 times larger than the small group.

Composition of items making up total assets varied only slightly between size groups. The most significant difference was that medium and large firms had considerably less of their assets invested in other cooperatives.

Grain associations had large investments in fixed assets such as storage and grain handling facilities. Since the amount of grain handled and stored would depend on how much storage space was available, net operating savings should be highly related to amount of investment in plant facilities. Simple linear regressions were computed in an effort to determine how much variation of income between different associations could be explained by investment in such assets. Table 4 indicates results of regression equations relating net operating savings to total assets, fixed assets, building and equipment (gross), and building and equipment (net).

All coefficients were found to be statistically significant at the 5 percent level. It may be inferred that building and equipment (gross) is the most important variable of the four independent variables. It had a correlation coefficient of .76, indicating that it explains more variation in operating savings among associations than any other variable in Table 4. This equation would indicate that for every \$1.00 increase in building and equipment (gross) net operating savings would increase 6.5 cents.

TABLE 4.--Simple regression coefficients, standard error of b, and correlation coefficients for 64 grain associations

Net operating savings related to:	: constant: a	: coefficient: b	: standard error of b:	: correlation coefficient
Total assets	-3,962.3	.04594	.0059	.70
Fixed assets	-5,221.2	.09098	.0105	.74
Building and equipment (gross)	-6,753.5	.06506	.0071	.76
Building and equipment (net)	-5,278.1	.09282	.0109	.73

Liabilities and Member Equity

Since total liabilities and member equity equal total assets for a given association, liabilities and member equity actually reveal ownership of assets.

Liabilities consist of the debt of the association. This debt is what is owed to persons other than the owners. Liabilities consist of both current liabilities and other liabilities. Current liabilities include all debts that fall due within the next operating year such as accounts payable, grains payable, accrued taxes, accrued patronage refunds, and accrued expenses. Any portion of long term debt due within the next year is also included. Other liabilities include claims against the firm which have a maturity period of one year or longer, such as mortgages, certificates of indebtedness, and deferred patronage refunds (with fixed due date).

Members equity represents assets owned by members of the cooperatives. Money invested by members may be in the form of common or preferred stock, or members may buy memberships. In this sample,

thirty-seven associations were financed primarily by common and preferred stock, eight had both stock and membership financing and 9 were financed mainly by memberships. Deferred patronage refunds (no fixed due date) are cooperative savings which have been allocated but no date set for distribution to members. Surplus and reserves represent the difference between total savings to date and total patronage refunds plus dividends to date.

Members on the average owned 60.8 percent of the total assets of their association, (Table 5). Debt to creditors was evenly divided between current (19.5 percent) and long term liabilities, (19.7 percent). Deferred patronage refunds made up the largest single source of funds for financing operations, since they financed over one-fourth of all assets. Surplus and reserves made up next most important source of operating funds and amounted to 16.5 percent of all assets.

Members of small associations owned slightly over one-half (53.5 percent) of the assets of their associations; whereas, members of the medium and large associations owned 59.2 and 65.3 percent respectively of their total assets. As a result the small and medium size associations had to incur more long term debt (26.6 and 20.2 percent respectively) versus only 16.8 percent for the large associations. The percent of current liabilities did not vary with size. However, small associations had more long term debt (26.6 percent of total liabilities and members equity) compared with only 20.2 percent for medium, and 16.8 percent for large associations.

TABLE 5.—Average liabilities and member equity and percent each is of total, by size groups

	All associations :		Small :		Medium :		Large :	
	Dollar	Percent	Dollar	Percent	Dollar	Percent	Dollar	Percent
Accounts payable	47,391	5.3	12,613	4.2	66,629	7.6	106,798	3.3
Notes payable	77,471	8.7	32,958	11.0	63,518	7.2	313,330	9.6
Other current liabilities	47,530	5.5	14,239	4.7	50,889	5.8	166,779	5.0
TOTAL CURRENT LIABILITIES	172,392	19.5	59,810	19.9	181,036	20.6	586,907	17.2
Mortgages payable	96,690	10.9	41,910	14.0	101,783	11.6	294,707	9.0
Other	78,306	8.8	37,682	12.6	75,060	8.5	254,253	7.8
TOTAL OTHER LIABILITIES	174,996	19.7	79,592	26.6	176,843	20.2	548,960	16.8
TOTAL LIABILITIES	347,388	39.2	139,402	46.5	357,879	40.8	1,135,867	34.7
Common stock	79,150	8.9	26,577	8.9	93,775	10.7	228,851	7.0
Preferred stock	63,987	7.2	22,600	7.5	47,895	5.5	296,200	9.0
Memberships	8,228	1.0	1,278	.4	4,129	.5	59,416	1.8
Deferred patronage refund (no due date)	229,191	25.9	54,935	18.3	185,199	21.1	1,103,472	33.9
Surplus & reserves	116,673	16.5	50,510	16.8	174,683	19.9	415,281	12.7
Other member equity	10,962	1.3	4,722	1.6	12,512	1.5	29,496	.9
TOTAL MEMBER EQUITY	538,891	60.8	160,622	53.5	518,193	59.2	2,137,716	65.3
TOTAL LIABILITIES AND MEMBER EQUITY	886,279	100.0	300,024	100.0	876,072	100.0	3,273,583	100.0

Fully one-third of the large grain associations' assets were financed by deferred patronage refunds; an amount twice as much as that of the small group.

Operations

Operations for the associations are summarized in the statement of operations (Table 6). This table lists sources of income, describes the nature of expenses, and shows amount of savings or of loss incurred by a firm during the year's operations.

Items included in the statement of operations can be classified into three sections: (1) the gross operating income section—which shows gross margins from sales (sales-cost of goods sold) plus storage, handling, services and other operating income; (2) the net operating savings section—which shows operating expenses in running the business that are deducted from gross operating income in order to obtain operating savings or loss for the period; (3) total net savings section—in which patronage refunds from regionals and other nonoperating income are added to operating savings.

An average association had almost \$1.5 million of sales during the 1963 operations. Sales for a single association ranged from \$300 thousand to almost \$12 million. Twelve associations had under \$500 thousand sales, twenty had sales from \$500 thousand to \$1 million, twenty-two had sales from \$1 million to \$2 million, and ten had sales of over \$2 million.

Grain marketing sales made up 60.1 percent of the average association's sales. Wheat, reported separately by 56 firms made up 39.0 percent of total

TABLE 6.—Average statement of operations and percent selected items are to total gross operating income

	All associations :				Medium :				Large :			
	Dollar	Percent	Dollar	Percent	Dollar	Percent	Dollar	Percent	Dollar	Percent	Dollar	Percent
Marketing sales	883,176		443,302		772,417		3,095,912					
Farm supply sales	586,913		173,395		587,652		2,243,546					
Marketing margins—sales	22,261	10.5	14,399	23.1	17,990	8.7	71,432	8.6				
Farm supply margins—sales	89,156	42.0	19,634	31.5	85,624	41.5	381,855	45.6				
Storage and handling	80,100	37.7	2,875	35.1	88,957	40.2	301,165	36.0				
Service	16,437	7.7	5,605	9.0	16,593	8.0	59,122	7.1				
Other	4,305	2.1	875	1.3	3,094	1.6	23,037	2.7				
Gross Operating Income	212,259	100.0	62,388	100.0	206,258	100.0	836,611	100.0				
Expenses												
Salaries and wages	83,739	39.5	26,906	43.1	78,958	38.3	330,881	39.6				
Taxes	9,755	4.6	3,094	5.0	9,928	4.8	35,687	4.3				
Insurance	5,168	2.4	1,930	3.1	5,330	2.6	17,454	2.1				
Repairs	4,200	2.0	1,214	1.9	3,380	1.6	18,941	2.3				
Interest	11,595	5.5	5,368	8.6	15,095	5.9	34,432	4.1				
Depreciation	29,388	13.8	9,811	15.7	29,866	14.5	105,717	12.6				
Advertising	2,891	1.4	712	1.1	3,262	1.6	10,073	1.2				
Utilities	7,281	3.4	1,912	3.1	7,361	3.6	28,423	3.4				
Office supplies	2,473	1.2	709	1.1	2,242	1.1	10,198	1.2				
Plant supplies	2,443	1.2	603	1.0	2,400	1.2	8,654	1.0				
Bad debt	595	0.3	356	0.6	907	0.4	270	—				
Legal and accounting	1,374	0.6	791	1.3	1,562	0.8	2,924	0.3				
Other	14,604	6.8	3,586	5.8	13,547	6.4	65,251	7.8				
TOTAL EXPENSES	175,506	82.7	56,992	91.4	170,838	82.8	668,905	79.9				
Net Operating Savings	36,753	17.3	5,396	8.6	35,420	17.2	167,706	20.1				
Patronage refunds—regionals	42,503		15,450		38,745		166,288					
Other non-operating income	1,348		986		610		5,845					
TOTAL NET SAVINGS	80,604		21,832		74,775		339,839					

sales and accounted for nearly two-thirds of total marketing sale. Grain sorghum reported by 26 firms was next in importance and accounted for 7.7 percent to total sales. Thirty-five associations reported a general item "grains," which accounted for 7.5 percent of total sales. Together, these three items accounted for over half of total sales. Comparisons between the different sized groups may be noted in Table 7. Marketing sales were more important for small groups (71.9 percent of sales) versus 56.9 and 58.0 percent of total sales for medium and large groups respectively. Wheat was relatively more important in larger groups and for all groups was by far the largest single item sold.

All but one association reported farm supply sales. Feed, reported by 33 firms was the most important single supply item and accounted for 6.1 percent of supply sales. Fertilizer sales, reported by 41 firms, and gasoline, reported by 36 firms, were next in importance. These three items accounted for about 40 percent of farm supply sales. Over one-half of farm supply sales were in general classification groups having little identification. Forty-four associations had "miscellaneous petroleum and auto supplies" classified under one heading, 55 had "general merchandise," 28 reported "miscellaneous production supplies," and 5 reported "other building materials." Grain commodities generally were much better identified than farm supply items. For example, four associations reported feed and seed together, eight reported feed and merchandise together, and three reported feed, seed, fertilizer, and merchandise together.

TABLE 7.--Individual commodity sales as a percent of total association sales, by size groups

Item	: No. associ- : : ations : associ- : : reporting : ations : Small : Medium : Large				
Grains	35	7.5	8.0	8.8	5.7
Wheat	56	39.0	36.5	39.1	40.2
Financed contract wheat	7	1.9	9.0	0.6	--
Corn	26	1.6	3.9	1.7	0.4
Grain sorghum	22	7.7	6.0	5.4	10.9
Barley	19	0.2	0.3	0.3	0.2
Rye	7	0.1	0.1	0.1	a
Soybeans	19	1.8	7.8	0.7	0.3
Alfalfa seed	3	0.1	a	0.1	0.1
Oats	15	0.2	0.3	0.1	0.2
TOTAL MARKETING SALES	<u>64</u>	<u>60.1</u>	<u>71.9</u>	<u>56.9</u>	<u>58.0</u>
Misc. petroleum and auto supplies	44	5.0	1.2	4.9	6.9
Gasoline	36	5.2	4.2	6.1	4.7
Tractor fuel (diesel)	4	a	a	0.1	a
L. P. gas	30	1.6	0.5	2.2	1.4
Kerosene - fuel oil	6	0.2	a	0.2	0.2
Lubricating oil	14	0.2	0.2	0.1	0.3
Grease	12	a	a	a	0.1
Tires and tubes	10	0.6	a	0.4	1.0
Feed	33	6.1	4.6	11.7	0.8
Seeds	16	0.3	0.4	0.4	0.1
Fertilizer	41	4.7	6.4	4.1	4.5
Hardware	4	0.2	--	0.4	0.1
Paint	3	a	a	a	--
Other building materials	5	0.6	0.3	1.0	0.3
Misc. production supplies	28	6.7	3.4	4.6	10.4
General merchandise	55	7.6	6.9	5.4	10.3
Coal	3	a	a	--	0.1
Machinery and implements	1	0.2	--	0.5	--
Appliances	2	0.3	--	a	0.7
Produce	3	a	--	a	--
Groceries	3	0.4	--	1.0	--
Fruits and vegetables	1	a	a	--	--
Other	0	a	a	a	0.1
TOTAL FARM SUPPLY SALES	<u>63</u>	<u>39.9</u>	<u>28.1</u>	<u>43.1</u>	<u>42.0</u>
TOTAL ASSOCIATION SALES	64	100.0	100.0	100.0	100.0

^aLess than .05 percent of total sales.

Gross Operating Income

Gross operating income is obtained from two major sources (1) gross margins from sales and (2) other operating income such as storage and handling and services provided patrons.

Gross Margins on Sales

Gross margins received for all commodities sold are shown in Table 8. Gross marketing margins as a percentage of commodity selling price were 1.9 percent for wheat, 2.9 percent for financed contract wheat, 4.1 percent for grain sorghums and 3.8 percent for corn. Gross margins on farm supply items averaged 9.8 percent for feed, 10.0 percent for fertilizer, 41.0 percent for L.P. gas (propane) and 16.6 percent on gasoline. Large associations generally had smaller marketing margins and larger farm supply margins. Overall gross margins were higher for large associations, primarily because a larger percent of their sales were farm supply items. Some items, such as groceries and appliances, were not strictly farm supply items. They were included since they were related and were handled by a few of the associations.

Gross margins and inventory turnovers computed are averages for the respective size groups. These margins and inventory turnovers will vary for different associations within the groups.

Annual inventory turnovers were calculated by dividing cost of sales by average of beginning and ending inventories. (See Table 9.) Marketing inventory turnovers were not considered very reliable. Associations with similar actual turnovers could appear to have quite

TABLE 8.—Gross margins on sales, by size groups

Item	All : associations :	Small :	Medium :	Large
Grains	3.5	4.0	2.8	4.2
Wheat	1.9	2.7	1.8	1.7
Financed contract wheat	2.9	2.8	3.6	—
Corn	3.8	4.2	3.4	4.4
Grain sorghum (milo)	4.1	5.6	4.4	3.5
Barley	5.6	6.7	5.4	5.0
Rye	7.3	9.7	6.6	6.9
Soybeans	2.8	2.7	2.6	3.9
Alfalfa seed	(10.0) ^a	14.9	9.5	(35.1) ^a
Oats	7.4	9.8	10.0	4.3
TOTAL MARKETING	<u>2.5</u>	<u>3.2</u>	<u>2.3</u>	<u>2.3</u>
Misc. petroleum and auto supplies	19.3	21.5	20.4	18.3
Gasoline	16.6	13.2	17.3	17.1
Tractor fuel (diesel)	25.2	28.6	21.0	28.3
L. P. gas	41.0	43.8	42.9	37.4
Kerosene-fuel oil	21.4	17.6	19.4	23.4
Lubricating oil	26.7	22.9	26.9	27.9
Grease	27.5	19.3	34.7	27.1
Tires and tubes	21.5	10.8	20.6	22.9
Feed	9.8	9.3	9.7	12.3
Seeds	11.2	9.7	8.7	20.7
Fertilizer	10.0	7.0	9.2	12.8
Hardware	23.4	—	25.9	15.1
Paint	22.7	22.1	29.3	—
Other building materials	21.6	23.5	19.9	24.6
Miscellaneous production supplies	12.6	10.5	7.8	15.2
General merchandise	14.0	11.0	13.8	15.1
Coal	12.2	15.6	—	11.3
Machinery and implements	3.3	—	3.3	—
Appliances	28.1	—	15.1	28.4
Produce	2.0	9.1	25.5	—
Groceries	13.3	—	13.3	—
Fruits and vegetables	4.8	4.8	—	—
Other	32.8	—	37.3	32.8
TOTAL FARM SUPPLIES	<u>15.2</u>	<u>11.3</u>	<u>14.6</u>	<u>17.0</u>
TOTAL SALES	7.6	5.5	7.6	8.5

^a Parentheses indicate a loss on sales.

TABLE 9.--Inventory turnover on farm supply sales, by size group

Item	: All : associations :	: Small :	: Medium :	: Large
Misc. petroleum and auto supplies	5.6	4.5	4.8	6.4
Gasoline	26.6	31.9	23.3	30.0
Tractor fuel (diesel)	15.0	9.0	12.0	^a
L. P. gas	27.5	39.8	25.5	29.8
Kerosene-fuel oil	19.3	3.4	20.3	27.2
Lubricating oil	1.9	1.6	1.9	1.9
Grease	1.9	2.6	2.1	1.7
Tires and tubes	1.8	4.1	1.8	1.7
Feed	9.8	12.5	9.6	8.1
Seeds	8.5	13.0	6.7	14.7
Fertilizer	5.9	6.8	7.2	4.6
Hardware	1.7	—	1.5	2.7
Paint	0.9	1.0	0.3	—
Other building materials	1.8	1.0	1.8	2.0
Miscellaneous production supplies	7.4	5.4	4.9	11.0
General merchandise	4.4	3.1	3.0	6.9
Coal	8.2	12.6	—	7.6
Machinery and implements	2.9	—	2.9	—
Appliances	1.8	—	2.9	1.8
Produce	48.7	38.9	57.3	—
Groceries	12.4	—	12.4	—
Fruits and vegetables	9.1	9.1	—	—
Other	2.0	—	1.9	2.0
TOTAL	<u>6.2</u>	<u>5.7</u>	<u>5.9</u>	<u>6.8</u>

^aNo beginning or ending inventory.

different turnovers because their accounting years ended at different phases of the sale of highly seasonal items. Typically yearly turnovers for major farm supply items were feed-9.8 times, fertilizer-5.9 times, L.P. gas-27.5 times, and gasoline-26.6 times.

It is difficult to say how fast an item should turn over, but some interesting comparisons were noted when turnovers of farm supply items were compared with those of a study conducted in 1959 on what was

considered "above average" farm supply cooperatives.¹ For example, total farm supply inventory turnover in 1959 averaged 10.8 times per year, or almost twice as fast as the farm supply inventory turnover computed in this study.

In 1959 selected supply items such as feed had an average turnover of 17.7 times per year, compared with 9.8 times per year in 1963. Fertilizer turnover in 1959 averaged 30.4 times per year as compared with 5.9 times per year in 1963.

These 1959 averages of farm supply inventory turnovers would seem to indicate that handling and merchandising of inventories have become a major problem for grain cooperatives. There are costs which are directly related to size of inventory. These costs include interest, insurance, taxes, shrinkage, theft, and obsolescence. According to several authorities, these costs may easily amount to 10 percent of the average inventories on hand each year.²

A linear multiple regression analysis was made to determine effects of gross margins and inventory turnover on net operating savings. The equation computed is the following:

$$X_1 = -2,923.572 + 22.745X_2 + .329X_3$$

(3.67) (.037)

¹T. R. Eichers, Inventory Management, by Selected Retail Farm Supply Co-ops, Area 4, Kansas, Nebraska, Missouri, Iowa, and Illinois. United States Department of Agriculture, Farmer Cooperative Service, General Report 66, 1959.

²T. R. Eichers, loc. cit.

In the equation X_1 = operating income (dollars), X_2 = inventory turnover (in tenths of one turnover), and X_3 = gross margin (dollars). $R = .747$. Standard errors of the regression coefficients are shown in parentheses. Both coefficients were found to be statistically significant at the 5 percent level.

This analysis indicates that on the average net operating savings changed \$22.74 for every .1 change in inventory turnover and 32.9 cents for every \$1.00 change in gross margins. Thus, it is shown that both inventory turnover and gross margins had an important effect on success of the cooperative.

Other Operating Income

Almost half of gross operating income came from grain storage and handling, services, and other operating income. Storage and handling income accounted for nearly 80 percent of other operating income and 37.7 percent of gross operating income. Service income (grinding, mixing, drying, and other services) was next in importance and amounted to 7.7 percent of gross operating income. Storage and handling were important sources of income for most of the grain associations in the study. Over three-fourths of the associations obtained over 25 percent of their gross operating income from storage and handling.

A simple linear regression analysis was made to determine the effect of storage and handling income on net operating savings. The equation computed was the following:

$$X_1 = -4,006.74 + .5143X_2$$

(.054)

X_1 = net operating savings (dollars), and X_2 = storage and handling income (dollars). $r = .77$. The coefficient was found to be significant at the 5 percent level and has a standard error of .054. This equation indicates that on the average net operating savings changed 51.4 cents for each \$1.00 change in storage and handling income.

Operating Expenses

Total operating expenses averaged \$175,506 for associations in the study or approximately 82.7 percent of gross operating income. (See Table 6.) The largest single expense item was for salaries and wages. It required an expenditure of 39.5 cents per \$1.00 gross operating income. Depreciation, interest, and taxes were next in importance requiring an expenditure of 13.8 cents, 5.5 cents, and 4.6 cents respectively per one dollar gross operating income.

On the average, 91.4 cents of expenses were required to get one dollar gross operating income in the small associations contrasted with 82.8 cents in the medium and 79.9 cents in the large associations. There is a difference of 11.5 cents in expenses per one dollar gross operating income. Although the large group paid slightly more than average for labor, it is observed that other major expense items decreased as a percent of gross operating income when compared with the percent these expense items were of gross operating income for small and medium groups. Thus it appears that large firms do enjoy some economies because of their larger operations. Large firms have extensive retirement and health benefit programs which most of the smaller associations do not have. For purposes

of this study, expenses for these programs were included as part of total employee labor costs and are probably a primary reason large associations had higher labor expenses.

Net Operating Savings

In a previous section, success was measured by return on investment in local associations. This indicates profitability of the local association in "its own right."

The average grain association returned 5 cents for every dollar invested locally. When separated into size groups, it is evident there was a noticeable difference in return on investment. Table 10 indicates that the small group returned only 2.3 cents, medium -4.8 cents, and large-6.1 cents for every dollar invested locally. Even though total investment affects net operating savings large variations between associations in each size group existed. Standard deviations on return on investment for associations in each size group were computed and indicate that small firms, in addition to having lower returns, also have the largest variations in income. Medium and large associations, in addition to having higher returns, have less variation between firms in the group. The standard deviations are shown in parentheses. Although level of returns was related to investment, such variables as control of expenses, margins, inventories and amount of other operating income also had a great effect on success.

TABLE 11.—Distributions for net savings and corporate income, with percentage calculations by size groups

	Total : net : savings :	Patronage allocations ^a	Cash	Non-cash	Total	: corporate income :	State income :	Federal : income :	Stock : dividends :	Surplus : and reserves
Small associations										
Average for group	21,832	3,862	13,004	16,866		4,966	206	1,155	632	2,973
Percent net savings	100.0	17.7	59.6	77.3		22.7	0.9	5.3	2.9	13.6
Corporate income	—	—	—	—	—	100.0	4.1	23.3	12.7	59.9
Medium associations										
Average for group	75,531	18,943	39,281	58,224		16,307	407	3,980	2,506	9,414
Percent net savings	100.0	25.1	52.7	78.1		21.9	0.6	5.3	3.4	12.6
Corporate income	—	—	—	—	—	100.0	2.5	24.4	15.4	57.7
Large associations										
Average for group	339,839	83,452	204,858	288,310		51,529	1,064	17,769	12,763	19,933
Percent net savings	100.0	24.5	60.3	84.8		15.2	0.3	5.2	3.8	5.9
Percent corporate income	—	—	—	—	—	100.0	2.1	34.5	24.7	38.7
All associations										
Average for all 64	80,598	19,344	46,064	65,408		15,180	369	4,278	2,813	7,720
Percent net savings	100.0	24.0	57.2	81.2		18.8	0.5	5.3	3.5	9.5
Percent corporate income	—	—	—	—	—	100.0	2.4	28.2	18.5	50.9

^aFive small and three medium size associations reported a total for state and federal income taxes but no distribution. Two medium associations showed no breakdown in patronage allocations. Totals were distributed by applying average relationships which prevailed in the remaining associations.

Total corporate income is total net savings after patronage allocations have been made. Cooperatives paid on the average 2.4 cents state tax and 28.2 cents federal taxes per one dollar corporate income. Dividends paid on stock accounted for an average of 18.5 cents per dollar corporate income. Slightly over one-half (50.9 percent) was retained in the association as surplus and reserves.

The two larger groups distributed a larger amount of total net savings to their members than did the small associations. The larger group also returned a higher percentage of the patronage allocation in actual cash than did small associations.

Summary

In summary the average grain association in the study had assets valued at \$886 thousand. Slightly over half of total assets were fixed assets, indicating a large investment in fixed plant and facilities. The most prominent difference in asset composition by size group was that medium and large associations proportionally had smaller investments in regional cooperatives.

Members owned on the average 60.8 percent of the assets of their association. Members of large associations owned on the average 65.3 percent of their assets compared with 53.5 percent for small associations and 59.2 percent for medium associations.

About 60 percent of the \$1.5 million sales were grain marketing sales. Because of low grain margins (2.5 percent of sales), marketing sales only constituted 10.5 percent of gross operating income. The

remaining portion of gross operating income consisted primarily of income from farm supply sales (42 percent), storage and handling income (37.7 percent), and service income (7.7 percent).

The amount of grain available for storage has decreased markedly in the last few years. This fact is reflected in the reduction in relative importance of storage income since 1960. Storage income in 1960 made up on the average 62.4 percent of gross operating income, compared with only 37.7 percent for associations included in this study. A simple linear regression equation indicated that net operating savings changed 51 cents for every one dollar change in storage income. Thus, reductions in amount of storage would appear to have a large effect on the amount of an association's net operating savings.

Large associations appeared to have some economies as a result of their larger operations. Large associations required fewer expense per one dollar gross operating income than did small associations. Percentage return on investment was computed for each size group. These averages indicated that the larger associations had higher returns on investment than smaller associations. Standard deviations computed on percentage returns on investment for each size group indicated that small firms, in addition to having lower returns, also had the largest variations in income. Large firms, in addition to having higher returns, had less variation between firms in the group. Thus, although the level of return was related to investment, other variables also had large effects on amount of savings.

A comparison of farm supply inventory turnovers with those of a study conducted in 1959 on selected "above average" farm supply co-operatives indicated that inventory control had become a major problem for cooperatives. Farm supply inventories turned over almost twice as fast in the 1959 study as was found to be the case in 1963. A multiple regression equation indicated that net operating savings changed \$22.74 for every .1 change in inventory turnover per year and 32.9 cents for every one dollar change in gross margin. Large associations on the average were able to maintain a faster farm supply inventory turnover and higher gross margins than the small and medium associations did.

ANALYSIS BY PROFIT LEVEL AND SIZE GROUP

When operations were compared among profit levels of the three size groups several differences in composition of income were noted. One of the differences was the relative importance of storage and handling income among profit levels. Storage and handling, as a source of income, seemed most important to the success of small and medium-size associations so they will be compared first.

Both small and medium-low profit groups had smaller grain sales and larger farm supply sales as a percent of total sales than did high profit firms. (See Appendix Table 21.) Medium-low profit firms even averaged more gross operating income than did the medium-high profit firms (\$1.6 million versus \$1.1 million). Income from grain storage and handling was almost twice as important for high profit firms (44.5 percent for small and 50.8 percent for medium) as it was for low profit firms (24.0 percent for small and 29.0 percent for medium).

Large associations appeared to be quite different. Large-high profit firms received less than one-third of their gross operating income from storage and handling as compared with large-low profit associations which received 40 percent from storage and handling. Large-high profit firms were well diversified with almost one half (46.3 percent) of sales coming from farm supply items, compared with 37.8 percent for large-low profit firms.

The balance sheet, statement of operations, expenses, gross margins and inventory turnovers for selected items, are illustrated in Appendix Tables 19-24.

Ratio Analysis

A more meaningful interpretation of a firm's financial statements can be obtained when key items in the statements are expressed in relation to other items. There is not just one single ratio which management can compute to explain a firm's position. Several ratios, each showing certain relationships between selected key items should be computed and compared in light of each other. A ratio can indicate the position the firm is in and is indicative of certain weak points, but ultimately it is up to management to interpret a ratio correctly and to start corrective action.

Ratios which were computed and compared are commonly classified as (1) liquidity ratios; (2) solvency ratios; (3) operating ratios; and (4) profitability ratios.

Liquidity Ratios

Liquidity ratios are measures to determine ability of a firm to meet its current obligations. One of the most common ratios used is the current ratio, computed by dividing current assets by current liabilities. A ratio of 2:1 is often considered a minimum acceptable standard. The average for all associations used in this study was 1.59:1, somewhat less than the standard. Small-size firms had current ratios averaging 1.43:1, medium-size firms 1.53:1, and large-size firms 1.72:1. (See Table 12.) With the exception of the medium-size firms the high profit firms had better current ratios than the low profit firms had. (See Table 13.) The only firms which met the standard were large-high profit associations which averaged 2.27:1. Only one-fourth of the firms in the sample had current ratios of 2:1 or better.

The acid test ratio is computed by dividing liquid assets (current assets minus inventories) by total liabilities. Only quick current assets are included, since inventories are less liquid and may require some time to be converted into cash. A commonly accepted standard is 1:1. Only eleven associations met this standard, and the average was .52:1. Small firms with ratios averaging .55:1 were in a better position than large associations with ratios of .48:1. Except for the medium-size firms the high profit firms were in better positions. Those ratios indicate a possibility that the associations have either unusually large accounts receivable, are holding excessive inventories, or have large current liabilities.

TABLE 12.--Liquidity and solvency ratios, by size group

	Average all : associations :	Small :	Medium :	Large :
<u>Liquidity Ratios</u>				
Current ratio	1.59	1.45	1.53	1.72
Acid-test ratio	.52	.55	.54	.48
Supply accounts receivable/ current assets (%)	18.0	20.6	20.6	14.2
Accounts receivable (%)				
0-30 days	47.6	31.6	38.7	66.4
31-90 days	20.7	25.4	24.0	13.6
Over 90 days	31.7	38.5	37.3	20.0
Inventory/net working capital (times)	1.43	1.64	1.52	1.29
Supply inventory turnover (times)	6.2	5.7	5.9	6.8
<u>Solvency Ratios</u>				
Member equity/total assets (%)	60.8	53.5	59.2	65.3
Fixed assets/member equity (%)	.85	.94	.89	.80

Accounts receivable divided by current assets will give an indication whether accounts receivable are excessive. A generally accepted standard is that receivables should not exceed 40 percent of current assets. Associations in the study averaged 18 percent of their current assets in accounts receivable. High profit firms had on the average four to six percent less of their current assets in accounts receivable than did low profit firms for all three size groups.

Amount of accounts receivable outstanding does not tell the whole story. To determine if accounts are collectable, their age must be considered. For example, accounts under 30 days are fairly liquid assets, while older accounts may be more doubtful. Only 20 percent of the large association's accounts receivable were over 90 days old. Small firms had

TABLE 13.--Liquidity and solvency ratios, by size group and profit level

Item	Small		Medium		Large	
	Low profit	High : profit	Low profit	High : profit	Low profit	High profit
<u>Liquidity ratios</u>						
Current ratio	1.31	1.63	1.54	1.52	1.47	2.27
Acid-test ratio	.47	.64	.56	.50	.32	.81
Supply accounts receivable/ current assets (%)	22.8	13.4	22.8	17.8	16.5	10.9
Accounts receivable (%)						
0-30 days	40.0	31.4	35.7	42.2	71.8	41.4
31-90 days	24.9	25.9	23.6	24.3	12.0	21.2
Over 90 days	35.1	42.7	40.7	33.5	16.2	37.4
Inventory/net working capital (times)	2.41	1.19	1.51	1.53	1.75	.92
Supply inventory turnover (times)	5.5	6.1	6.1	5.6	5.6	8.3
<u>Solvency ratios</u>						
Member equity/total assets (%)	40.0	65.3	53.9	64.4	60.9	71.2
Fixed assets/member equity (%)	1.24	.78	.90	.88	.83	.76

almost twice as many (38.5 percent) over 90 days. Some surprising comparisons exist when profit levels are compared. The medium-size group was the only size group where the high profit firms averaged more accounts receivable under 30 days than did low profit firms.

Inventory to net working capital (total assets minus total liabilities) indicates if inventories are excessive. In general when inventories exceed net working capital, cash and accounts receivable are insufficient to cover current liabilities. Inventory for firms in the study averaged 1.43 times net working capital. Except for medium-size firms the high profit firms were in much better positions than low profit firms. Large-high profit firms were the only ones which met the standard. Small

firms were in poorer positions averaging 1.64 times net working capital versus 1.29 times net working capital for large firms. In addition to having large inventories, small and medium-low profit firms also had much more of their inventories in the form of farm supply items than did other profit levels. This situation may be noted in Appendix Table 19.

Inventory turnover is computed by dividing cost of goods sold by the average inventory. This ratio helps determine the probable length of time required to convert inventories into cash or receivables. A low ratio may indicate overinvestment in inventory, slow moving items, or poor merchandising ability of management. The average farm supply inventories turned over only 6.2 times per year. Large associations had faster farm supply inventory turnover, but variation between profit levels was not consistent.

Solvency Ratios

The most commonly used measure of long term solvency is probably the relation member equity to total assets. This represents percent of total assets owned by members. In general, the lower the ratio of member equity to total assets, the greater is the risk in the association's methods of financing. A commonly accepted standard for this ratio is 67 percent. The associations averaged 60.8 percent, somewhat below the minimum. One-third of the associations met this standard. Member equity ranged from 40.0 percent of total assets in small-low profit firms to 71.2 percent in large high profit firms. This ratio improved as size increased and was better for high profit firms in each size group.

The ratio fixed assets to member equity measures the owned capacity supporting a firm's equipment and facilities. Too large an investment in fixed assets means there is less internal capital available to finance current operations. Fixed expenses increase with overinvestment and the breakeven volume of sales increases. An indicated satisfactory maximum is that no more than .65 to .75 of member equity should be tied up in fixed assets. Smaller percentages are more favorable. Firms averaged .76:1, and ranged from 1.24:1 in the small-low profit group to .76:1 in large-high profit firms. Grain associations had very high investments in storage facilities which may explain in part why they failed to meet this standard. A ratio of more than 1 to 1 would indicate that a firm was borrowing money to finance daily operations. These two solvency ratios readily indicate why low profit firms are poorer credit risks than high profit firms.

Operating Ratios

Operating ratios measure how efficient the firm's resources are being utilized. Gross operating income to building and equipment indicates how efficiently fixed assets are being used. Normally sales is used instead of gross operating income to indicate how many times assets turn over during the year. However, since sales was not considered an accurate measure of volume in grain cooperatives, gross operating income was used. This ratio was intended to produce a comparable measure. A high ratio indicates more efficient use of assets. Surprisingly the large-high profit group was the only high profit group having a higher

ratio than low profit groups. Storage and handling income per \$1.00 building and equipment was considerably higher for small and medium-high profit firms. Large-high profit firms were the only firms showing smaller storage income per \$1.00 investment in buildings and equipment. (See Tables 14 and 15.)

Efficiency can also be measured by determining amount of input required to produce a given output. In this case a small ratio would indicate higher efficiency. Total expenses to get \$1.00 gross operating income averaged 82.7 cents. Expenses per \$1.00 gross operating income ranged from 107.8 cents for small-low profit firms to 70.3 cents for large-high profit firms. High profit firms consistently were more efficient in producing \$1.00 gross operating income. Expenses per \$1.00 gross operating income also decreased as the size of a firm increased, indicating large firms did have some economies due to their larger operation.

Salary and wages per \$1.00 gross operating income ranged from a high of 53.4 cents in the small-low profit firms to 31.4 cents in medium-high profit firms.

Profitability Ratios

Gross margins (sales minus cost of goods sold) divided by sales gives the amount of gross margins realized per dollar of sales. This margin, together with income from services must be sufficient to cover all operating expenses with something left over if an association is to realize any savings from operations. If storage income continues to

TABLE 11.—Operating and profitability ratios by size group

	Average all associations	:	Small	:	Medium	:	Large
<u>Operating Ratios</u>							
Gross operating income/building and equipment (%)	46.9		41.8		45.4		50.4
Storage and handling/building and equipment (%)	17.7		14.6		18.3		18.1
Storage and handling/elevator capacity (cents/bu.)	9.7		8.4		10.1		9.7
Expenses/gross operating income (%)	82.7		91.4		82.8		79.9
Salaries and wages/gross operating income (%)	39.5		43.1		38.3		39.6
<u>Profitability Ratios</u>							
Supply gross margins (%)	15.2		11.3		14.6		17.0
Grain gross margins (%)	2.5		3.2		2.3		2.9
Total gross margins (%)	7.6		5.5		7.6		8.5
Total operating savings/investment in local (%)	5.0		2.3		4.8		6.1
Total operating savings/member equity in local (%)	9.4		5.5		9.3		10.5
Total operating savings/sales plus other operating income (%)	2.3		0.8		2.4		2.9
Total net savings/total assets (%)	9.1		7.3		8.5		10.4
Total net savings/member equity (%)	15.0		13.6		14.4		15.9

TABLE 15.—Operating and profitability ratios by size group and profit level

	Small			Medium			Large		
	Low profit	High profit	Low profit	High profit	Low profit	High profit	Low profit	High profit	Low profit
Operating ratios									
Gross operating income/building and equipment (%)	42.8	40.9	48.0	43.2	45.9	56.0			
Storage and handling/building and equipment (%)	10.3	18.2	13.9	21.3	18.4	17.8			
Storage and handling/elevator capacity (cents/bu.)	6.9	9.0	8.3	11.5	10.0	9.2			
Expenses/gross operating income (%)	107.8	77.3	94.7	71.6	89.2	70.3			
Salaries and wages/gross operating income (%)	53.4	34.3	45.6	31.4	42.5	36.4			
Profitability Ratios									
Supply gross margins (%)	11.8	10.5	13.8	16.0	18.4	15.9			
Grain gross margins (%)	3.0	3.4	2.1	2.6	1.3	3.4			
Total gross margins (%)	6.3	4.8	7.7	7.5	7.8	9.2			
Total operating savings/investment in local (%)	-2.0	6.0	1.4	8.2	3.0	10.3			
Total operating savings/member equity in local (%)	-8.1	10.8	3.1	14.2	5.6	15.7			
Total operating savings/sales plus other operating income	-0.7	2.2	0.6	7.0	1.6	4.3			
Total net savings/total assets (%)	4.2	9.9	5.8	11.3	8.6	12.7			
Total net savings/member equity (%)	10.6	15.2	10.7	17.5	14.2	17.8			

decrease, margins on sales will become increasingly important in covering expenses. Although competition affects the level of gross margin, an association may be able to set within reasonable limits what the margin will be. An association can either take a large margin and refund the difference later or operate on a low margin and give the patron the benefit of his day-to-day transactions. Margins varied with the type of commodity being handled. In the study gross margins on grain were considerably lower than farm supply margins (2.5 percent against 15.2 percent). Some of the reasons are that farm supply margins must be sufficiently high to cover extra services such as delivery, credit extension, etc., demanded by patrons. Gross margins for major products by profit levels are presented in Appendix Tables 23 and 24.

Gross margins on sales averaged 15.2 percent for farm supplies, 2.5 percent for grain, and 7.6 percent for total sales. Larger firms maintained smaller margins on grain and higher margins on farm supply sales. Gross margins as a percent of sales was higher in the larger size groups. High profit associations maintained higher margins on grain, but only medium-high profit associations had higher margins on farm supply sales. The large-size group was the only group showing higher percent total margins for high profit firms. High margins, coupled with faster turnovers were certainly one of the explanations why the large-high profit firms were more successful.

Net operating savings were considered as a percentage of investment in local, member equity in local, and total sales plus other operating income. These are efficiency ratios relating net operating savings to

resources used, to member investment in local, and to volume of business.

The average association had a 5 percent return on investment, 9.4 percent return on member equity in local, and saved 2.3 percent of every one dollar of sales plus service income. Since the associations were separated according to return on investment the high profit firms, as would be expected, had higher ratios.

Ratio Analysis by Profit Levels

The ratio analysis indicates that high profit firms maintained current ratios of 1.52-2.27:1, and acid test ratios of .50-.81:1. Low profit firms had current ratios of 1.31-1.54:1, and acid test ratios of .32-.56:1.

These differences were not tested statistically to determine if they were significantly different. However, visual inspection indicates that there were differences between profit levels.

High profit associations had higher liquidity ratios indicating they were in a better position to meet short term commitments, and take advantage of purchase discounts than were low profit associations. Even though high profit firms were in better liquidity positions, many high profit firms did not meet the accepted standard of 2:1. When the acid test ratio was computed, neither of the two profit levels met the accepted standard of 1:1, although the high profit firms were in a better position. This ratio indicates that both profit levels had insufficient quick current assets available to meet current liabilities.

Accounts receivable as a percent of total assets indicated that high profit firms had less of their current assets in accounts receivable. High profit firms also had less of their net working capital tied up in inventories and generally had higher inventory turnovers. Excessive inventories are expensive to maintain, and the possibilities of theft, damage or obsolescence exists. Excessive inventories seemed to be a general problem of most of the associations in the study.

Variations in liquidity between profit levels can be compared by these significant ratios:

	<u>Low profit</u>	<u>High profit</u>
Current ratio	1.31- 1.54:1	1.52- 2.27:1
Acid test ratio	.32- .56:1	.50- .81:1
Accounts receivable/current assets	16.5 -22.8	10.9 -17.8
Inventory/net working capital	1.51- 2.41:1	.92- 1.53:1
Supply inventory turnover	5.5 - 6.1	5.6 - 8.3

Ratio analysis also indicated that there was a large difference between funds from creditors and equity for the profit levels. High profit associations relied less on short and long term debt and more on member equity as a source of funds than did low profit firms. High profit firms also maintained less member equity as fixed assets and therefore had a greater percent of their equity in a more flexible form. Both these ratios show why low profit firms are poorer credit risks. Solvency ratios computed are the following:

	<u>Low profit</u>	<u>High profit</u>
Member equity/total assets	40.0 - 60.9	64.4 - 71.2
Fixed assets/member equity	.83- 1.24	.76- .88

Operating ratios between profit levels indicated that high profit firms generally utilized their assets and inputs more efficiently.

Important operating ratios computed are the following:

Gross operating income/building and equipment (net)	42.8 - 48.0	40.9 - 56.0
Storage and handling income/building and equipment (net)	10.3 - 18.4	17.8 - 21.3
Storage and handling income/elevator capacity (bu.)	6.9 - 10.0	9.0 - 11.5
Expenses/gross operating income	89.2 - 107.8	70.3 - 77.3
Salaries and wages/gross operating income	42.5 - 53.4	31.4 - 36.4

High profit firms maintained margins on supply sales ranging from 10.5 - 16.0 percent, 2.6 - 3.4 percent on grain sales, and 4.8 - 9.2 percent on total sales. Low profit firms had somewhat higher margins on farm supply sales ranging from 11.8 - 18.4 percent, but had lower ranges on marketing (1.3 - 3.0 percent) and had 6.3 - 7.8 percent on total sales.

Other profitability ratios indicate that high profit firms were considerably more successful financially than low profit firms. Some important ratios in measuring success follow:

Return on investment in local	(2.0) ^a - 3.0	6.0 - 10.3
Return on members equity in local	(8.1) - 5.6	10.8 - 15.7
Operating savings/sales plus other operating income	(0.7) - 1.6	2.2 - 7.0

^aParentheses indicate loss on operations

Summary

In summary differences were found in composition of income among low and high profit groups. The large amount of storage and handling income contributed to the success of small and medium-high profit associations. Large associations appeared more diversified. Income from farm supply sales was relatively more important for large-high profit associations than for large-low profit associations.

Ratio analysis indicated that most of the associations had fairly poor liquidity ratios. The large-high profit associations were the only ones which met the generally accepted current ratio standard of 2:1. Acid test ratios computed for the different size and profit level groups also were lower than the generally accepted standard of 1:1.

Ratio analysis indicated that most associations had excessive inventories even when divided into profit levels. Inventory turnover was slow and showed little consistent variation among profit levels. Gross margins on inventories also showed little consistency among profit levels. Consistency was noted when changes in farm supply turnover rates were compared with changes in percentage gross margins among profit levels. In every case the profit level with the lowest gross margins had the fastest farm supply inventory turnover.

High profit associations were in a better long-run financial position. They had from 64 to 71 percent of their total assets financed by member equity. Member equity in low profit firms ranged from 40 to 61 percent of total assets. Most of the associations had less than the desired amount of member equity for the amount of fixed assets, although high

profit associations were in a better position than were low profit associations in this respect.

The ratio gross operating income to building and equipment indicated how efficiently the fixed assets were being utilized. Surprisingly, the large-high profit associations were the only high profit associations which made more efficient use of fixed assets than did low profit associations. One explanation might be that storage, which was more important in small and medium-high profit associations, required less expense per dollar gross income. Thus, although small and medium-high profit associations made less efficient use of facilities, expenses per one dollar gross income were sufficiently low to allow more net operating savings.

Expenses per one dollar gross operating income were considerably lower for high profit associations. Expenses per one dollar gross operating income for high profit associations ranged from 70.3 to 77.3 cents compared with 89.2 to 107.8 cents for low profit associations. High profit firms paid 31.4 - 36.4 cents for labor per one dollar gross operating income compared with 42.5 to 53.4 cents per one dollar gross operating income for low profit associations.

EXTENT AND TYPE OF DEPARTMENTATION

Even when associations separate their major revenue items satisfactorily, expenses must be matched with that revenue to get an accurate idea of the contribution a major product or service makes to the association. Take, for example, an association having three departments: grain, fertilizer, and petroleum products. The economic contribution of each of

the three departments can't be determined unless expenses are maintained separately for each. Also, separate expense classifications are needed if efficiency of inputs used in each department is to be evaluated.

In the study, 41 associations had headquarters operations only. Of these, only 6 had departmentation by product. (See Table 16.) The other 36 maintained revenue and expenses only for the firm as a whole.

TABLE 16.--Associations having departmentation by products and locations

Number of associations	:	Number of different product expense classifications
Headquarters operations only	35	1 ^b
	2	2
	2	3
	1	4
	1	7
	<u>41</u>	
Headquarters operations and one or more branches	6	1 ^b
	2	2
	1	3
	1	4
	3	5
	5 ^a	6
	2 ^a	7
	<u>20</u>	
	3	by location only
	<u>64</u>	

^aOne association in this group had both product and location departmentation.

^bOne expense classification for the firm.

Twenty-three associations had branch operations, six of which maintained expenses only for the association as a whole. Fourteen associations with branch operations had separate expenses for two or more products.

Three associations had expenses by location only (for each branch) and three associations maintained as many as seven different product expense classifications. Associations with several branches ideally should have product departmentation for each product. However, only two associations with branch operations had product departmentation for each branch.

Table 17 shows percent of total departmental sales coming from the major product in that department. In seven departments the major product accounted for less than 50 percent of total departmental sales. It is questionable whether these should have been classified as product departments. Included in this category were two elevator departments, two feed and merchandise departments, two petroleum, and one hardware department.

A reasonable minimum is that no less than one-half of sales should come from one or more closely related products. To approach true product departmentation sales of similar products should exceed 90 percent of a department's sales. Only 58 departments derived over 90 percent of their sales from a major product.

Sixteen associations reported an elevator department and four reported a grain department. A primary difference was that, in addition to grain sales, the elevator departments handled other merchandise while the grain departments handled only grain. The petroleum department consisted of departments called petroleum (7 associations), oil (1 association) and service station (6 associations). A difference was that service

TABLE 17.—Associations with one or more departments and percent major product is of department sales

Department	: Number of : : associations:	: Under 50% :	: 50-90% :	: Over 90% :	: Total
		(number of departments)			
Elevator	16	2	15	10	27
Grain	4	0	0	5	5
Petroleum	14	2	15	8	25
Bulk petroleum	5	0	0	7	7
Propane	5	0	1	6	7
Feed and seed	2	0	0	2	2
Feed and merchandise	3	2	2	0	4
Feed mill	3	0	0	3	3
Fertilizer	2	0	0	2	2
Lumber yard	3	0	0	3	3
Hardware	3	1	0	2	3
Hardware and lumber	1	0	1	0	1
Hardware and oil	1	0	1	0	1
Appliances	1	0	0	1	1
Grocery	4	0	0	4	4
Produce	1	0	0	1	1
General merchandise	2	0	0	2	2
Transport trucks	4	-	-	4	4
Administration	8	-	-	-	8
Non-patronage	2	-	-	-	2
Soybean plant	1	-	-	-	1

stations obtained only 25 to 75 percent of sales from petroleum products and the petroleum and oil departments obtained 75 to 100 percent of their sales from petroleum products. Although feed was a major supply item, none of the associations had feed departments. Feed was listed together with seeds twice and merchandise three times. In two of these departments, feed made up 70 and 46 percent of sales, and in the other fertilizer made up 68 percent of sales.

Sales, gross operating income, and expenses were tabulated by departments in an effort to determine the contribution departments were making.

These were the only measures available since assets by department were not available (Table 18).

TABLE 18.—Averages for selected ratios for departments classified by products

		: Expenses per :	:	:
		: \$1.00 gross	: Expenses	: Savings
Department	:	: operating	: per \$1.00	: per \$1.00
Kind	Number	: income	: sales	: sales
(cents)				
Elevator	25	79.9	a	a
Grain	4	82.1	a	a
Petroleum	25	89.4	19.5	1.8
Bulk petroleum	7	80.1	18.5	4.4
Propane	7	62.4	20.6	9.6
Feed and seed	2	96.9	14.4	1.1
Feed and merchandise	4	107.5	13.8	(0.5)
Feed mill	3	81.7	13.7	3.2
Fertilizer	2	110.1	20.9	(2.0)
Lumber yard	3	73.9	16.9	6.0
Hardware	3	111.2	22.7	(2.3)
Hardware and lumber	1	89.7	22.5	2.6
Hardware and oil	1	113.5	22.3	(2.7)
Appliances	1	78.7	28.1	7.6
Grocery	4	133.7	19.3	(4.5)
Produce	1	89.0	8.6	1.1
Transport trucks ^b	4	--	78.0	22.0
Soybean plant	1	97.4	8.5	0.2
General merchandise	2	83.4	13.2	2.9

^aElevator and grain department have large income from storage so sales is not an adequate measure of output.

^bComputed on the basis of trucking receipts.

Expenses per \$1.00 gross operating income ranged from a low of 62.4 cents for propane to a high of 133.7 cents for the grocery department. All grocery departments, fertilizer departments and hardware departments had operating losses.

Based upon savings per dollar of sales, propane departments were most efficient of all departments as they saved 9.6 cents out of each \$1.00 of propane sold. The appliance department was able to save 7.6 cents of every dollar sales, and lumber yards saved 6.0 cents of dollar sales. The transport truck departments were able to save 22 cents out of each dollar trucking revenue.

Although these data suggest that some departments were more efficient than others, care should be exercised in generalizing these results. In many cases there were only one or two observations for each type department. In these instances, it would be difficult to say that these results were characteristic of all departments of that type. Also, no knowledge was available on how expenses were allocated to each department or on the method of inventory valuation being used by each firm.

Even though a department may be losing money on operations, its effect on the performance of the whole firm must be considered. It may be that this product is attracting customers, who may purchase other products at the same time. In this case a department may contribute to overall business success even though the department is operating at a loss. The important thing is to know that it's losing money. Once a trouble spot is located, efforts can be made to find a remedy. It may be that with a more efficient use of inputs the department can begin making a positive economic contribution to the business. Without product departmentation this trouble spot probably would have gone unnoticed.

In determining what products should be classified as separate departments as an aid to management, a reasonable guide is that each

department or function essentially different should be accounted for separately. Products which have similar gross margin, similar labor requirements and similar consumer demand should be grouped together. The division must result in a good deal more uniformity in the receipts and expenses within departments than between them.

Departmental accounts should be planned so they provide maximum benefit to management, but are not unnecessarily burdensome to the bookkeeper who maintains the records. Attempting to break down the business into too many departments will create difficulties in keeping expenses common to one department. At the same time, to group together essentially different products will eliminate important information.

A possible dividing line for determining whether an activity should be separated has been set at approximately 10 percent of overall operations.¹ In using this guide, any activity which accounts for more than 10 percent of total income should be separated. If it accounts for less than 10 percent of overall income, it should be combined with another similar product.

In a cooperative handling products such as grains, lumber, petroleum, and feed, management should group each one separately. In these cases, there are substantial differences from one department to another. Many facilities will be different. Employees probably would be working primarily in one department, and customer demands for the output of each department would be different. Under these conditions, departmentation would be feasible from an accounting standpoint and useful from a

¹Robert L. Dickens, C.P.A. Management Accounting for Frozen Food, Locker, and Related Plants. United States Department of Agriculture, Farmer Cooperative Service, Agriculture Handbook 220, October 1961, p. 25.

management standpoint.

Some expenses, such as manager salary and general office expenses, are common to the business as a whole and not related to a specific department. Such expenses may best be charged to an overhead department and then allocated to each department by some reasonable basis whenever financial statements are prepared.

Departmentation as suggested will be both feasible and provide management with valuable information on business operations.

SUMMARY AND CONCLUSIONS

The objectives of the study were (1) to determine the success of the Kansas grain associations in 1963-64, (2) to determine certain selected efficiency and percentage ratios and to compare the ratios between associations of different sizes and different profit levels, (3) to determine the extent departmentation is being used, and (4) to determine the adequacy of the accounting system as an aid to management decision making.

The associations were divided into three size groups based on amount of gross operating income. Then each size group was summarized by means of averages. Large associations appeared to have some economies as a result of their larger operations. They averaged fewer expenses per dollar gross operating income and had higher returns on investment than did medium or small size associations. Standard deviations computed on percentage returns on investment for each size group indicated that smaller groups had larger variations among associations within the group than did either of the two larger groups.

Ratio analysis serves management as an aid in interpreting financial data. However, it must be remembered that no one ratio constitutes a final index of strengths or weaknesses of an individual firm. Ratios are averages, and are indicative of a firm's present position. As such they indicate "what is" and not optimum conditions of "what ought to be." Ratios developed in this study were average figures for associations within each individual size and profit level group. As such they should be useful to individual cooperatives in Kansas. By calculating these ratios an individual cooperative can assess its operations and see how it stands in relation to other cooperatives of similar size and nature. Ratios of high profit associations could be considered as indicative of above average operations. Firms striving to be successful should compare ratios for their firms with ratios for the high profit levels. If a particular ratio appears out of line, the cause of its deviation should be determined and corrective action taken.

Ratio analysis indicated that many of the associations had less than desirable liquidity ratios. High profit associations had current ratios ranging from 1.52 - 2.27:1, and acid test ratios of .50 - .81:1. Low profit firms were in a less desirable position as they had current ratios ranging from 1.31 - 1.54:1, and acid test ratios of .32 - .56:1.

A comparison of farm supply inventory turnovers with those of a study conducted in 1959 on selected "above average" farm supply cooperatives indicated that inventory merchandising had become a major problem for many of the cooperatives in this study. Farm supply items turned over nearly twice as fast in 1959 as similar items did in this study. Many associations

in this study had excessive inventories. Low profit associations had inventories ranging from 1.51 - 2.41 times net working capital. High profit associations were in a somewhat better position with inventories ranging from .92 - 1.53 times net working capital. Farm supply inventory turnovers were slow for all profit levels with no consistent pattern displayed among profit levels. However larger associations had somewhat faster turnovers.

Ratio analysis also indicated that there was an important difference among profit levels as to amount of funds supplied by member equity. High profit associations had member equity ratios ranging from 64 to 71 percent of total assets compared with 40 to 61 percent of total assets for low profit associations. Both profit levels had large amounts of fixed assets, but high profit firms had better ratios of fixed assets to member equity because they had better member equity ratios.

The ratio of gross operating income to building and equipment indicates how efficiently these fixed assets are being used. Large-high profit associations were the most efficient and were the only high profit group which was more efficient than low profit associations. One reason small and medium-high profit associations were not more efficient may be because storage was relatively more important for them and required less expenses per dollar gross operating income. Thus, although small and medium-high profit associations made less efficient use of their facilities, expenses per dollar gross operating income were sufficiently lower which allowed more net operating savings.

The types of departmentation used by associations in the study were either product or location. In some cases it was questionable which type of departmentation was being used. For example, in seven departments the major product accounted for less than 50 percent of total departmental sales. Only six of the forty-one associations with "headquarters operations only" maintained product departmentation. Of the twenty-three associations with branch operations six had only one expense classification. Seventeen with branch operations did have more than one expense classification. Of these seventeen, three maintained expenses only by location. Fourteen associations with branch operations had two or more different product expense classifications. However, only two of these had product departmentation for each branch.

Thus, information available in the annual audits, indicated that most of the associations in the study did not maintain accounting details which would enable a manager to determine a major product's contribution to the business.

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APPENDIX

TABLE 19.—Composition of assets by profit level and size groups as percent of total

	Small		Medium		Large	
	Low profit	High profit	Low profit	High profit	Low profit	High profit
	(percent)					
Cash	4.2	5.8	5.0	4.2	1.8	7.4
Accounts receivable	7.0	5.0	8.2	4.9	5.2	3.2
Grain inventories	4.7	6.6	7.3	6.1	9.2	6.1
Other inventories	12.8	6.0	11.6	8.2	8.6	9.2
Other current assets	2.2	4.0	3.7	4.0	6.9	3.9
TOTAL CURRENT ASSETS	<u>30.9</u>	<u>27.4</u>	<u>35.8</u>	<u>27.4</u>	<u>31.7</u>	<u>29.6</u>
Investment in other co-ops	19.9	21.4	15.5	15.9	17.4	15.6
Other investments	0	0	0.3	0.1	0.2	0.4
TOTAL OTHER ASSETS	<u>19.9</u>	<u>21.4</u>	<u>15.8</u>	<u>16.0</u>	<u>17.6</u>	<u>16.0</u>
Building and equipment (gross)	68.7	75.5	70.0	82.7	72.0	80.3
Less depreciation	20.3	24.5	22.5	26.6	22.5	27.9
Building and equipment (net)	48.4	51.0	47.5	56.1	49.5	52.4
Land	0.8	0.2	0.9	0.5	1.2	1.8
TOTAL FIXED ASSETS	<u>49.2</u>	<u>51.2</u>	<u>48.4</u>	<u>56.6</u>	<u>50.7</u>	<u>54.2</u>
TOTAL ASSETS	100.0	100.0	100.0	100.0	100.0	100.0
Dollar value total assets ^a	\$277.9	\$322.1	\$908.0	\$846.3	\$3,277.0	\$3,268.3

^a Rounded off to thousands of dollars

TABLE 20.—Composition of liabilities and member equity by profit level and size groups,
as percent of total

Item	Small			Medium			Large		
	Low profit	High profit	High profit	Low profit	High profit	High profit	Low profit	High profit	High profit
Accounts payable	3.1	5.1		10.7	4.5		2.0	5.0	
Notes payable	15.5	7.1		8.3	6.2		15.4	1.8	
Other current liabilities	4.9	4.6		4.2	7.4		4.1	6.3	
TOTAL CURRENT LIABILITIES	<u>23.5</u>	<u>16.8</u>		<u>23.2</u>	<u>18.1</u>		<u>21.5</u>	<u>13.1</u>	
Mortgages payable	19.5	9.2		12.9	10.3		12.8	3.9	
Other	17.0	8.7		10.0	7.2		4.8	11.8	
TOTAL OTHER LIABILITIES	<u>36.5</u>	<u>17.9</u>		<u>22.9</u>	<u>17.5</u>		<u>17.6</u>	<u>15.7</u>	
TOTAL LIABILITIES	<u>60.0</u>	<u>34.7</u>		<u>46.1</u>	<u>35.6</u>		<u>39.1</u>	<u>28.8</u>	
Common stock	8.1	9.5		10.0	11.4		6.3	7.9	
Preferred stock	5.7	9.1		3.3	7.6		15.8	0.0	
Memberships	0.9	0.0		0.7	0.2		0.6	3.4	
Deferred patronage refund (no due date)	17.7	18.9		22.4	19.9		28.8	40.6	
Surplus and reserves	6.5	25.7		15.9	24.0		8.4	18.4	
Other member equity	1.1	2.1		1.6	1.3		1.0	0.9	
TOTAL MEMBER EQUITY	<u>40.0</u>	<u>65.3</u>		<u>53.9</u>	<u>64.4</u>		<u>60.9</u>	<u>71.2</u>	
TOTAL LIABILITY AND MEMBER EQUITY	100.0	100.0		100.0	100.0		100.0	100.0	
Total dollar value ^a	\$277.9	\$322.1		\$908.0	\$346.3		\$3,277.6	\$3,268.3	

^a Rounded off to thousands of dollars

TABLE 21.—Statement of operations with percent selected items are to gross operating income

Item	Small			Medium			Large		
	Low profit	High profit	Low profit	Low profit	High profit	High profit	Low profit	Low profit	High profit
	(percent)								
Grain margins	18.3	27.2	8.6	8.9	31.7	11.9	5.3	43.9	47.4
Farm supply margins	43.9	20.8	51.1	32.5	6.2	6.2	49.2	47.4	59.3
Total margins on sales	62.2	48.0	59.7	41.4	7.9	2.8			
Storage and handling	24.0	44.5	29.0	50.8	40.1	31.7			
Service	12.3	6.2	9.5	6.7	7.9	6.2			
Other	1.5	1.3	1.8	1.1	2.8	2.8			
Total other operating income	37.8	52.0	40.3	58.6	40.7	40.7			
Gross operating income	100.0	100.0	100.0	100.0	100.0	100.0			
Operating expenses	107.8	77.3	94.7	71.6	89.2	70.3			
Net operating savings	(7.8)	22.7	5.3	28.4	10.8	29.7			
Patronage refunds-regionals	26.9	22.9	20.0	17.6	26.6	13.0			
Other non-operating income	1.3	1.8	0.0	0.5	0.7	0.7			
Total net savings	20.4	47.4	25.3	46.6	38.0	43.3			
Dollar value ^a									
Grain sales	\$352.2	\$534.3	\$843.0	\$709.4	\$2,921.6	\$3,328.4			
Farm supply sales	213.2	133.6	766.7	417.7	1,777.8	2,864.5			
Gross operating income	57.6	67.2	207.2	205.4	744.7	959.2			

^aRounded off to thousands of dollars.

TABLE 22.—Statement of operating expenses with percent selected items are to total operating expense

	Small		Medium		Large	
	Low	High	Low	High	Low	High
	profit	profit:	profit	profit:	profit	profit
	(percent)					
Salaries and wages	49.6	44.4	48.1	43.9	47.7	51.8
Taxes	4.6	6.4	5.1	6.7	5.5	5.2
Insurance	1.8	3.2	3.0	3.3	2.4	2.8
Repairs	1.8	2.5	2.2	1.8	3.9	2.6
Interest	10.9	7.6	7.3	6.8	6.8	3.0
Depreciation	15.0	19.9	15.4	20.0	16.3	15.4
Utilities	3.3	3.4	4.2	4.4	4.1	4.4
Office supplies	1.2	1.3	1.3	1.4	2.0	0.9
Plant supplies	0.8	1.4	1.5	1.3	1.5	1.0
Other	11.0	9.9	11.9	10.4	9.8	12.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Dollar value ^a						
Total expense	\$62.0	\$51.9	\$196.3	\$147.1	\$664.5	\$674.7

^aRounded off to thousands of dollars

TABLE 23.—Gross margins of major marketing commodities by profit levels and size groups

Item	Small		Medium		Large	
	Low	High	Low	High	Low	High
<u>Gross Margins</u>						
Grains	4.8	3.8	2.4	3.7	13.8	4.0
Wheat	2.8	2.7	1.6	2.0	0.3	3.1
Financed contract wheat	3.8	2.3	3.6	--	--	--
Corn	2.5	5.7	4.5	2.7	4.2	6.6
Oats	13.1	5.3	10.7	9.1	4.1	13.6
Grain sorghum	5.2	5.9	4.0	4.7	3.2	5.9
Barley	3.2	13.0	4.3	37.0	3.7	12.9
Rye	--	9.7	6.6	--	7.2	6.5
Soybeans	1.3	4.5	2.2	2.8	3.9	--
Total	3.0	3.4	2.1	2.6	1.3	3.4

TABLE 24.--Gross margins and inventory turnover of major farm supply items by profit level and size groups

Item	Small		Medium		Large	
	Low	High	Low	High	Low	High
	: profit	profit:	profit	profit:	profit	profit
<u>Gross Margins</u>						
Gasoline	13.1	13.4	17.5	16.9	7.0	18.6
L. P. gas	43.8	--	42.5	43.7	43.0	28.0
Lubricating oil	27.1	18.0	26.3	28.0	28.6	23.2
Grease	27.8	11.0	42.1	24.3	27.8	22.4
Feed	8.9	9.9	9.3	14.0	12.2	17.4
Seed	9.1	10.5	9.2	8.1	20.7	--
Fertilizer	7.2	6.8	8.3	11.1	14.1	10.3
Misc. production supplies	10.9	--	7.0	8.0	18.7	13.6
General merchandise	11.7	9.9	11.4	15.1	14.7	15.3
Total farm supply	11.8	10.5	13.8	16.0	18.4	15.9
<u>Inventory Turnover</u>						
Gasoline	34.7	27.7	20.1	34.3	29.9	31.5
L. P. gas	39.8	--	33.2	17.5	24.1	42.8
Lubricating oil	1.6	16.7	2.2	1.5	2.0	1.9
Grease	2.3	2.9	1.8	2.6	1.8	1.3
Feed	12.1	13.0	10.1	6.8	8.1	5.7
Seed	16.7	10.0	6.0	7.7	14.7	--
Fertilizer	6.2	7.6	6.5	9.1	3.5	10.9
Misc. prod. supplies	5.6	--	2.8	6.3	11.1	11.0
General merchandise	2.8	3.9	2.4	3.5	4.2	10.7
Total farm supplies	5.5	6.1	6.1	5.6	5.6	8.3

AN ECONOMIC ANALYSIS OF FACTORS AFFECTING SUCCESS
OF KANSAS GRAIN COOPERATIVES, 1963-64

by

RICHARD LEE EPARD

B. S., Kansas State University, 1962

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Farmer grain cooperatives have expanded over the years until they now play an important role in the agriculture sector of the economy. In addition to marketing farmers' produce, grain cooperatives typically handle large quantities of farm supplies such as feed, fertilizer, and petroleum products.

In the post World War II years, adoption of improved farming practices enabled the American farmer to expand production. As a result grain production increased more than consumption and storage of grain became a profitable source of income for many Kansas cooperatives. Since about 1960 grain carryover has been reduced and storage as a source of income has declined.

Associations now, more than ever, need to know how much a particular product contributes to the success of the total business operation. Adequate accounting records are mandatory if this type information is to be available.

Objectives of the study were (1) to determine the success of grain associations in 1963-64, (2) to determine certain selected efficiency and percentage ratios and compare these ratios between associations of different sizes and profit levels, (3) to determine the extent departmentation is being used, and (4) to determine the adequacy of the accounting system as an aid to management decision making.

The 64 associations used in the study were a 25 percent random sample of the population plus the five largest associations operating in Kansas during 1963-64. Associations were divided into three size groups on the basis of gross operating income and averages computed for each group.

Financial statements were presented for the three size groups and for the average for all 64 associations. Differences in financial statement composition between the three size groups were discussed. Success was measured by percentage net operating savings was to investment in local which measured the earning power of a local cooperative in "its own right." It appeared that large associations did enjoy some economies from their larger operations. They averaged fewer expenses per one dollar gross operating income and had higher returns on investment than did either the small or medium size associations. Small associations, on the average, returned only 2.3 percent on investment, as compared to 4.6 percent for medium, and 6.1 percent for large associations. Small associations not only had lower returns, but had larger variations in income among associations than did medium and large associations.

A more meaningful interpretation of a firm's financial statements is possible by ratio analysis. For this part of the study, the three size groups were further separated into low and high profit associations and selected ratios were compared. Ratio analysis indicated that many associations had less than desirable liquidity ratios. High profit associations had current ratios ranging from 1.52 - 2.27:1 and acid test ratios ranging from .50 - 81:1. Low profit associations were in a less desirable position, with current ratios ranging from 1.31 - 1.54:1 and acid test ratios of .32 - .56:1.

The analysis also indicated that excessive farm supply inventories and slow turnovers were a major problem area for most associations in the study. This situation was especially evident in smaller associations and low profit associations.

High profit associations had more member equity financing. In high profit associations it ranged from 64 to 71 percent of total assets compared with 40 to 61 percent of total assets for low profit associations.

In multi-product firms such as grain cooperatives major products and services should be separated into departments to determine their contribution to the business. Information available in the annual audit indicated that many associations did not maintain accounting details which would enable a manager to determine a major product's contribution.